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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/557,190	11/18/2005	Lutz Rose	HM-657PCT	7251
40570	7590	09/15/2008		
FRIEDRICH KUEFFNER			EXAMINER	
317 MADISON AVENUE, SUITE 910			CHEN, CHRISTINE	
NEW YORK, NY 10017				
		ART UNIT	PAPER NUMBER	
		1793		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/557,190

**Applicant(s)**

ROSE ET AL.

**Examiner**

CHRISTINE CHEN

**Art Unit**

1793

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 5-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-11 is/are rejected.
- 7) ☒ Claim(s) 1, 5-6 and 10-11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/08)
- Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of Claims***

Claims 1 and 5-11 are pending and claims 2-4 are canceled.

### ***Status of Previous Rejections/Objections***

The previous objection to the specification is withdrawn. The previous rejection of claims 5 and 6 under 35 U.S.C. 112, second paragraph is withdrawn.

### ***Claim Objections***

1. Claims 1, 5-6, and 10-11 are objected to because of the following informalities:  
The phrase "performs" should be replaced with the phrase "preforms" on line 11 of claim 1, line 3 of claim 5, line 3 of claim 6, line 2 of claim 10 and line 2 of claim 11.  
Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claims 1 and 7-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of claim 1 is indefinite due to the use of the phrase "compressed preforms (8) and/or preforms (8) provided with a binder" in lines 7-8 and the phrase "density of the preforms (8) is adjusted by compression pressure and/or a type and quantity of an added iron carrier" in lines 9-10. Due to the use of such phrases, it is unclear what the claim is intended to cover in terms of scope. In the meantime, the

claim is interpreted as involving compressed preforms (without a binder) and the adjustment of density by compression pressure (and not by a type and quantity of an added iron carrier) in efforts to allow examination to progress.

The scope of claim 7 is indefinite due to the use of the phrase "flux, preferably limestone" in line 2. Due to the use of such a phrase, it is unclear what the claim is intended to cover in terms of scope. In the meantime, the claim is interpreted as being drawn to any flux (not necessarily limited to limestone) in efforts to allow examination to progress.

The scope of claim 8 is indefinite due to the use of the phrase "slag thinner, preferably  $\text{CaF}_2$ " in line 2. Due to the use of such a phrase, it is unclear what the claim is intended to cover in terms of scope. In the meantime, the claim is interpreted as being drawn to any slag thinner (not necessarily limited to  $\text{CaF}_2$ ) in efforts to allow examination to progress.

The scope of claim 9 is indefinite due to the use of the phrase "reducing agent, preferably silicon and/or aluminum" in line 2. Due to the use of such a phrase, it is unclear what the claim is intended to cover in terms of scope. In the meantime, the claim is interpreted as being drawn to any reducing agent (not necessarily silicon and/or aluminum) in efforts to allow examination to progress.

The scope of claim 10 is indefinite due to the use of the phrase "the sidewalls (10) and/or the furnace roof (4)" in lines 2-3. Due to the use of such a phrase, it is unclear what the claim is intended to cover in terms of scope. In the meantime, the

claim is interpreted as being drawn to the furnace roof of the electric arc furnace (not the sidewalls) in efforts to allow examination to progress.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 5-8 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funk (US 3807986) in view of Guillot (US 6228137).

Funk discloses a method for creating a vigorous carbon boil in a steel bath and an eruption of slag plumes in an electric arc furnace during a steelmaking process wherein a compressed preform, particularly a briquette comprising metal oxides and carbon, is introduced *through* the slag layer *onto* the molten metal bath of an electric arc furnace. Funk discloses the effective density of the briquettes to be about 5.5 grams per cubic centimeter which will allow the briquette to penetrate the slag layer and enable melting of the briquette and carbon-oxygen reaction to occur continuously and predictably (see abstract, claims 1 and 6-7, and col. 3 lines 36-41).

While Funk does not explicitly state how such a density is to be achieved, Funk discloses that the size, shape, and mass of the briquettes, all of which relate to density, govern their ability to penetrate the slag upon their introduction into the furnace. In addition, compacting or sizing operations are known in the art to affect the physical properties of a compacted product (see col. 9 lines 39-43 and col. 4 lines 41-45).

Given Funk's disclosure above, it would have been obvious to one having ordinary skill in the art during production of the briquette to adjust the density by compacting or sizing operations in order to achieve the density specified by Funk.

Given the introduction of the briquettes through the slag on the top of the steel bath and the density of the briquettes as 5.5 grams per cubic centimeter, it would be inherent that the preforms are heavier than the slag but lighter than the molten steel and float in the slag near a phase boundary between the metal melt and the slag.

Given the commonalities between the method of Funk and the claimed method, it would be reasonable to expect that the occurrences of reduction of metal oxide by carbon in the slag, which result in the formation of gas bubbles in the slag, thereby causing the slag to foam are present in Funk's method as well. This is supported by Funk's disclosure of a vigorous carbon boil and eruption of slag plumes upon receipt of the briquettes (see claims 1 and 6).

In disclosing such a method as described above, Funk does not identify the steel melt as being a high-chromium steel melt.

Guillot, in disclosing a process for producing a foaming slag melted in an electric furnace, teaches the addition of a metal oxide and carbon to a high-chromium steel melt, particularly a stainless steel melt, in an electric arc furnace (see abstract, Field of the Invention section and Summary of the Invention section).

It would have been obvious to one of ordinary skill in the art to modify the method of Funk with the stainless steel melt of Guillot in order to facilitate the foaming of slag in

a stainless steel melt thereby protecting the melt and moderating the temperature of the process.

With regards to the adjustment of density by compacting the preforms as recited in claims 5 and 6, this step was addressed in a discussion of Funk's method. Given the coverage of this step by Funk, it is reasonable to expect that the density of Funk allows for the preforms to disintegrate uniformly and slowly, whereby an evolution of gas in the slag occurs uniformly preforms a relatively long period of time as in claim 5 and allows for the preforms to disintegrate with a time delay as in claim 6.

With regards to the addition of flux as required by claim 7, Funk discloses the briquettes can have additional materials such as fluxes mixed with them to produce self fluxing characteristics (see col. 2 lines 64-68).

With regards to the addition of a slag thinner as recited in claim 8, Funk does not explicitly disclose the addition of  $\text{CaF}_2$  to the briquette. However, Funk discloses that the briquettes may have additional different materials mixed with them to produce desirable properties and effects and discloses the addition of fluorspar, a mineral composed of  $\text{CaF}_2$ , as being a known additive in an electric furnace steelmaking process (see col. 1 lines 15-17, col. 1 lines 31-37 and col. 2 lines 64-67). Therefore, it would have been obvious to one having ordinary skill in the art to modify the briquette of Funk to include the fluorspar known in the art in order to facilitate the thinning of slag.

With regards to the introduction of the preforms as required by claims 10 and 11, Funk discloses the introduction of the briquettes through the furnace roof via duct 21

which allows the material to fall directly into the center of the electrode delta formed by electrodes 29 (see col. 5 line 66-col. 6 line 3 and Figure 2).

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funk (US 3807986) in view of Guillot (US 6228137) and further in view of Masucci (EP 0655508).

Neither Funk nor Guillot disclose the presence of a reducing agent in the briquette as shown in paragraph 4 above.

Masucci, in disclosing a process for producing foamed slag in stainless steel production in an electric arc furnace, teaches the charging of silicon in order to protect the chromium in the bath from oxidation (see Field of the Invention section, col. 2 lines 55-col. 3 line 1 and col. 4 lines 1-2).

It would have been obvious to one of ordinary skill in the art to modify the method taught by the combination of Funk and Guillot with the silicon of Masucci in order to protect the chromium in the bath from oxidation and facilitate the production of foaming slag by addition of a reducing agent.

6. US 3925060 which teaches a compact containing iron oxide and carbon and method for its use in steelmaking is cited as a reference of interest.

7. Data sheet of AISI Type 204 stainless steel lists a density of  $7.75 \text{ g/cm}^3$  (heavier than Funk's briquette with density of  $5.5 \text{ g/cm}^3$ ) is cited as a reference of interest.

8. Applicant's arguments with respect to claims 1 and 5-11 have been considered but are moot in view of the new ground(s) of rejection.



***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **CHRISTINE CHEN** whose telephone number is (571)270-3590. The examiner can normally be reached on Monday-Friday 8:30am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/  
Supervisory Patent Examiner, Art  
Unit 1793

CC